PLEASE READ FULLY BEFORE CONSTRUCTION

INTRODUCTION: With the large number of games that will become available in 1980 and 1981 it became apparent that a universal control unit housing all the basic control functions, would be a distinct advantage. We have with considerable care designed into the Gimini Control Unit -

(i) Power Input protection and stabilization
(ii) Clock oscillator for cartridge
(iii) Control switching
(iv) Colour Burst Oscillator
(v) Sound Modulation Oscillator
(vi) PAL encoder
(vii) Modulator

This design will allow for all the control variables and operating conditions to be met in future cartridges.

CIRCUIT DESCRIPTION: A 12 volt source is applied to the power input as shown in the attached diagrams. The IN4148 diode is a reverse polarity protection diode and the zener 220 ohm/BC548 etc form a stabilised power input circuit. A power source of 10 to 14 volts d.c. can be used with a rating of a minimum of 100mA. We strongly recommend the use of a mains adaptor (with good filtering) such as a calculator/cassette/radio adaptor, rather than batteries. While torch batteries operate satisfactorily for a short while, they cannot sustain 80 to 100mA current drain. Once the voltage, on load, drops below about 10 volts the zener effectively "switches off" the whole video game. The clock oscillator (4011/39K/22pf/60pfT) positioned in mid board has an output of 3.547 MHz. This provides a clock frequency to the cartridge ic. The 4.4 MHz crystal provides an oscillator frequency for the PAL colour burst. The sound modulation oscillator provides a 5.5MHz frequency which modulates the cartridge sound onto the overal RF signal output. The PAL encoder converts the cartridge outputs (blue/green/red) into a composite colour video signal and the RF modulator converts the total video and sound on signal to a VHF signal which is then fed to the antenna socket on a domestic colour television receiver. The modulator is set on channel 8 or 9 and has a preset minor adjustment.

CONSTRUCTION PROCEEDURE:

(i) Fit all 32 shorting links as per the component overlay diagram with the tinned single strand hook up wire provided. The insulation may be either totally removed or left on the wire. The two longest links A to A andB to B should however, have the insulation left on the wire. Ensure that all the links fit tightly down against the PCB and run from point to point, without kinks etc.

(ii) Solder all the shorting links and cut off excess lead lengths.

(iii) Fit all the 23 resistors. Once again ensure they are fitted tightly against the PCB. Solder all the resistors and cut off excess lead length. To ensure a professional finish, it is good practise when fitting resistors/components, to have all the colour codes commencing from one end/side of the PCB as it makes overall construction clearer and ease of servicing. This is not absolutely necessary and does not make any electrical difference, except to those components so polarised.

(iv) Fit all the 7 IN914/IN4148 diodes - the devices MUST be fitted with the correct polarity.

(v) Fit the three trimmer capacitor (red top = 60pf).

(vi) Fit the two BC548 transistors - these must also be fitted in the correct polarity - allow lead length of only 5mm. Also fit the two 75uH RF chokes provided close to the PCB.

(vii) Solder all the components fitted in steps (iv) to (vi) above and cut off excess lead length.

(viii) Fit the 4.4MHz crystal - this must sit hard down on the PCB - solder carefully without excess heat and cut off excess lead length. Fit all the remaining low profile components, capacitors etc: note correct polarity. Also fit the 15pf buffer capacitor underneath the PCB - see component overaly diagram.

(ix) Fit (a) the slide switch
(b) the four rocker switches - ensure the white tabs on top of the switch are ALL to the lower side of the PCB. Bend over the locating tabs slightly to secure on PCB - do not short out any PCB tracks.
(c) the three push button switches - these are PCB mount and NOT mounted on the front panel.
(d) All four IC sockets.

Solder all the above.

(x) Fit the edge connector to the PCB - to fit place the edge connector so that the connector pins are adjacent to the appropiate tracks on the edge of the PCB. Solder one pin at either end and then check that the connector is positioned correctly over the PCB tracks. NOTE The edge connector can only be fitted ONE way - treble check this. The edge connector must be fitted so that the contacts in the slot on the connector are on the upper side of the PCB(component side.) (When the cartridge PCB is fitted to connector it will be "upside down". When the connector is positioned correctly, solder all the edge connector pins to the PCB tracks.

(xi) Fit the PAL ENCODER to the PCB - fit the module close down to the PCB - solder all the feed through pins, to the PCB tracks.

(xii) Fit the pre tunned modulator to the PCB and solder the two connections plus the two earth/mounting sutds.

(xiii) Attach the flying leads from the two prefitted joystick controls, to the PCB.

(xiv) Attach two leads from the PCB power input to the power source. This can be done directly or through a plug/socket mounted on the red water panel blank provided. A plug/socket is not provided in the kitset and is left to your personal choice.

(xv) Carry out a final "quality control" inspection on your own work. The following points should be noted (a) ALL the componentry should be fitted reasonably tightly down against the PCB thereby ensuring ALL lead lengths are SHORT!

(b) Soldering can be no less than good plus. We have taken considerable care in the design of the PCB and solder "splatter", "blobs", dry joints etc. were not catered for in the design. Only a hot, clean tip, iron should be used together with resin core solder - BOTH items are available from ORBIT.

(xii) Fit an aerial cable to the game modulator output plug provided in the kit. TV ribbon coaxial cable or light twin flex can be used. Lead length is not important. Under NO circumstances should the game unit be connected to your regular tv receiving aeria. The game unit can now be connected to the TV, either the 7t or 300 ohm input.

SETTING UP PROCEEDURE - WITH CARTRIDGE FITTED:

1. Adjust the TV set to channel 8/9.
2. Adjust the clock oscillator until a stable black and white picture is obtained - ensure game selector switch is anywhere mid position.
3. Adjust the sound oscillator until a good sound resolution is heard through the TV speaker.
4. Adjust the colour burst oscillator until the colour appears on the picture.

DO NOT UNDER ANY CIRCUMSTANCES ADJUST ANY PRE ALIGNED COILS ON THE PAL ENCODER.

The vertical movement of the bats can be adjusted with the trim pot on the cartridge i.e. with the joysticks in a central position, adjust the preset pot so that the bats appear mid screen.

Unfortunately the sound on modulation is a little less than perfect and tends to "craze" the picture marginally. "Sound on video" is a problem as old as television itself and is NOT a poor design concept from ORBIT. By running through alignment 1 to 4 proceedures three or four times to effectively fine tune the unit, this can be eliminated completely. We recommend however, particularly in the more graphic games car race submarine war etc, that the sound output from the cartridge/edge connector be taken to the "aux" input on your home stereo amplifier for excellent results. The sound oscillator ic would then be removed from its socket to disable the tv sound.

(xiii) The PCB can now be fitted carefully into the custom case provided and secured with four self tapping screws - the PCB/Joysticks are a tight fit and care should be taken. The case is secured together by the two bolts on the under side of the case.

We trust that you have enjoyed the construction of this kitset and we thank you for your custom - other ORBIT KITSETS are available and for further information write :

ORBIT ELECTRONICS,
P. O. BOX 7176, AUCKLAND. -"please include a 14 cent stamp"

WARNING: ALL INTERGRATED CIRCUITS INCLUDED IN THIS KITSET ARE CMOS DEVICES AND MUST BE HANDLED ACCORDINGLY. REPLACEMENT UNDER WARRANTY IS NOT AVAILABLE - THIS IS NOT OPEN TO NEGOTIATION UNDER ANY CIRCUMSTANCES. REPLACEMENT PARTS ARE AVAILABLE FROM THE MANUFACTURER AND ONLY CORRECT AND IDENTICAL REPLACEMENTS SHOULD BE USED.

ERRORS AND OMMISSIONS: From time to time the human element in packing kitsets with multiple parts, minor errors occur. If your kitset is a component short, write directly to the manufacturer - ORBIT ELECTRONICS,
P. O. BOX 7176, AUCKLAND

and the correct component will be forwarded promptly, without charge, via AIRMAIL. Please accept our apology and we regret any minor inconvenience.

TO OPERATE: The control switches are reasonably self explanatory.

(i) Slide selector switch - selects various games available.
(ii) Power on/off - switches supply to PCB on/off.
(iii) Small/Large - independantly selects player bat size.
(iv) Pro/AM - when selected "on" the ball automatically moves faster after seven hits of the bat.
(v) Reset - sets on screen scoring to zero.
(vi) Serve - On some games both serve buttons must be depressed to activate ball. Note- on soccer the ball changes colour to indicate which player kicks off.

ORBIT GIMINI COLOUR UNIT - PARTS LIST

1 x ORBIT CUSTOM PLASTIC CASE
1 x FRONT PANEL PRE FIXED
2 x JOYSTICKS -100K LINEAR
1 x EDGE CONNECTOR - 32 WAY
1 x SLIDE SWITCH - 10 WAY
4 x ROCKER SWITCHES
3 x PUSH BUTTON SWITCHES
1 x PCB
1 x RF MODULATOR
1 x PAL ENCODER
1 x CRYSTAL 4.4MHz
2 x 60pf (RED TOP) TRIMMER CAPACITORS
1 x 30pf TRIMMER CAPACITOR
2 x 82uf MINIATURE RF CHOKE
4 x 14 PIN IC SOCKETS
2 x 4011 IC'S
2 x 4069/74C04 IC'S
7 x IN4148/IN914 DIODES
2 x BC548 TRANSISTORS.

4 x PCB MOUNTING SCREWS
1 x OUTPUT SLIDE BRACKET
1 x ASSORTED MULTI STRAND HOOKUP WIRE
1 x SINGLE STRAND HOOK UP WIRE
(PCB SHORTING LINKS)
RESISTORS ¼ WATT 5%
1 x 10K BROWN BLACK ~~RED~~ ORANGE
2 x 3.3K ORANGE ORANGE RED
1 x 82K GREY RED ORANGE
4 x 100K BROWN BLACK YELLOW
3 x 27K RED PURPLE ORANGE
2 x 100E BROWN BLACK BROWN
4 x 4.7K YELLOW PURPLE RED
2 x 39K ORANGE WHITE ORANGE
1 x 220E RED RED BROWN
1 x 8.2K GREY RED RED
1 x 33K ORANGE ORANGE ORANGE
1 x 15K BROWN GREEN ORANGE
2 x 18K BROWN GREY ORANGE.

CAPACITORS

2 x 100mfd 25 VOLT ELECTROLYTIC
5 x 100pf 50 VOLT DISC CERAMIC
1 x 22pf " " " "
1 x 15pf " " " "
2 x 560pf " " " "
1 x 0.001 mfd MYLAR (GREEN CAP)
2 x 0.047 mfd " " "
2 x 0.1 mfd " " "

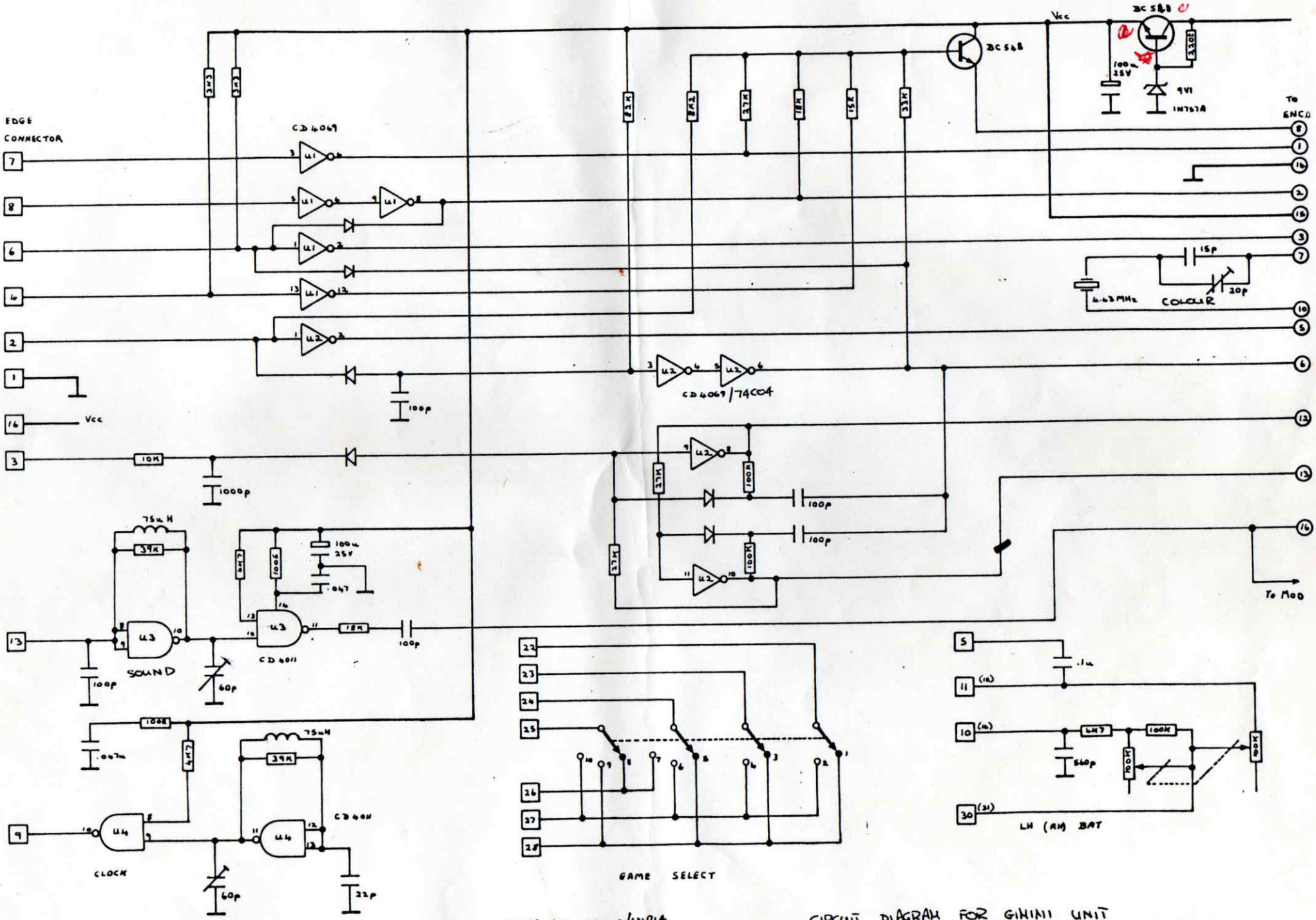
CONDITIONS OF SALE:

(i) ORBIT KITSETS are sold with FULL instructions and constructional details and diagrams.

(ii) Kitsets are not returnable for refund after seven days from invoicing or if kitsets are fully or partially constructed.

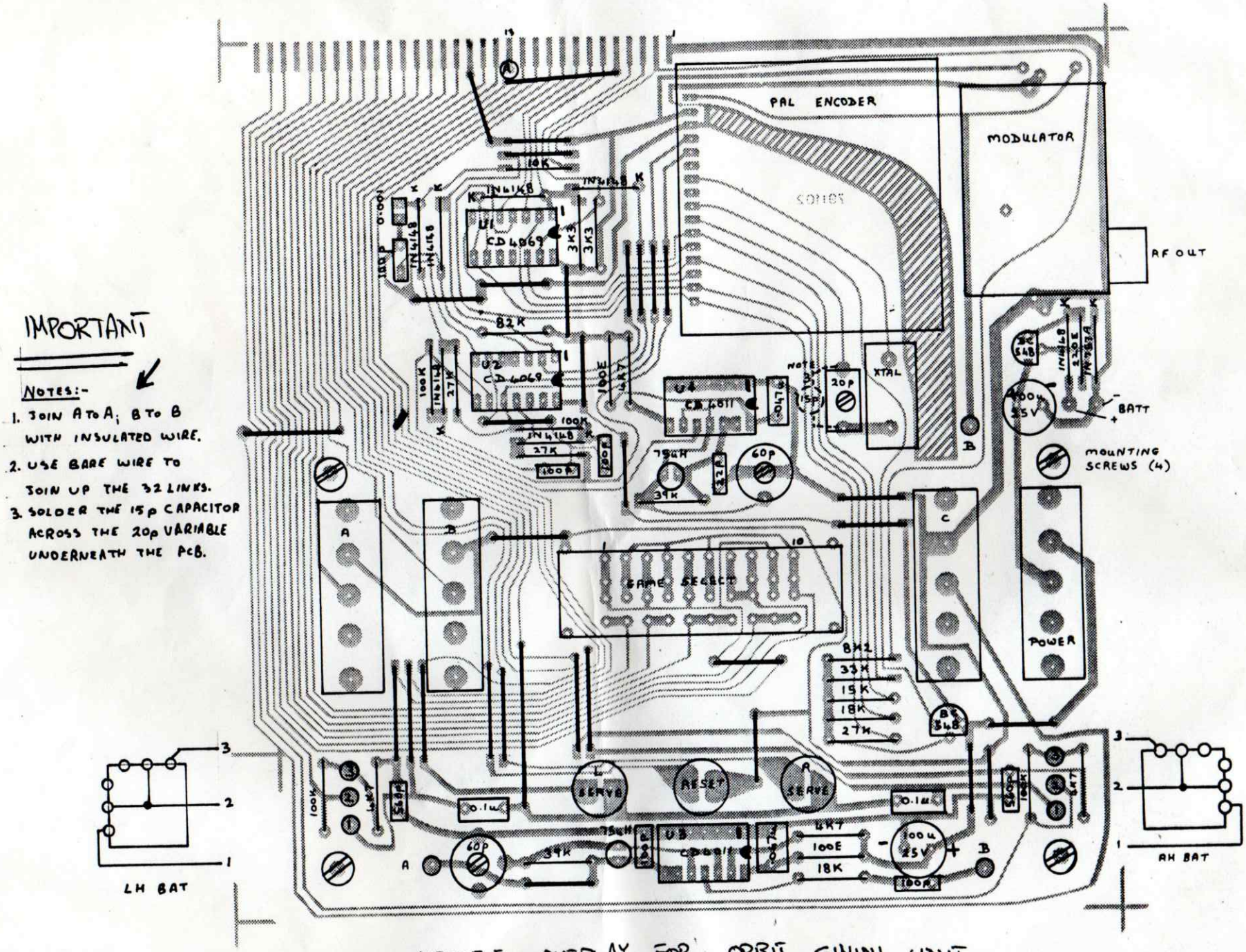
(iii) If you have ANY problems relating to the construction of your kitset, please accept our invitation to WRITE, including a Stamped Self Addressed Envelope for reply. Invariably your problems have surfaced before and hopefully we have the solutions. Absolutely NO fault analysis accepted over the telephone. Remember, we are not an "electronics school" but a supplier of kitsets of an interesting and different nature. Thank you for your valued custom.

(iv) A "FIRST-AID" repair facility is available on this kitset - see FAULT SERVICE SLIP enclosed with kitset.



DIODES ARE IN4148/IN914

CIRCUIT DIAGRAM FOR GINIMI UNIT
(17 DEC 1979)



IMPORTANT

NOTES:-

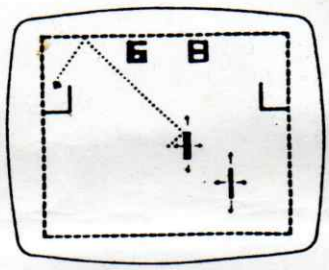
1. JOIN A TO A; B TO B WITH INSULATED WIRE.
2. USE BARE WIRE TO JOIN UP THE 32 LINKS.
3. SOLDER THE 15p CAPACITOR ACROSS THE 20p VARIABLE UNDERNEATH THE PCB.

COMPONENT OVERLAY FOR ORBIT GINI UNIT
(17 DEC 1979)

TEN GAMES CARTRIDGE

CONSTRUCTION:

(i) Fit the single shorting link to the PCB.
(ii) Fit the three IN4148/IN914 diodes with correct polarity.
(iii) Fit the six resistors.
(iv) Fit the BC548 transistor with 5mm maximum lead length.
(v) Fit the trimpot to the PCB.
(vi) Fit the 2.2uF electrolytic (or 4.7uF) note correct polarity. The electrolytic will have to lie flat against the PCB, rather than sit vertically.
(vii) Fit the 28 pin ic socket and finally the CMOS AY-3-8610 ten games ic - note correct polarity.
Refer to GIMINI instructions for setting up proceedure.
(viii) After the preset is correctly set, the PCB can now be fitted to the cartridge case.

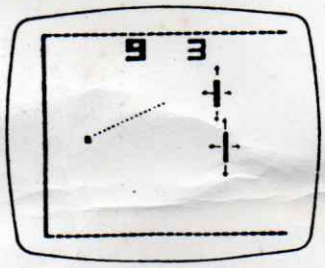


Basketball

The basketball games use the closed playing area as shown above. The players must deflect the ball and cause it to enter the top of the goal to score. The game starts when both players depress the service buttons. The ball moves from the serve point with a random angle in either direction.

Solo Basketball

Solo basketball is a one player game which utilizes only the left basket. The right counter displays the number of hits the player makes without scoring while the left counter shows the number of baskets made. Play starts when the right serve button is depressed.

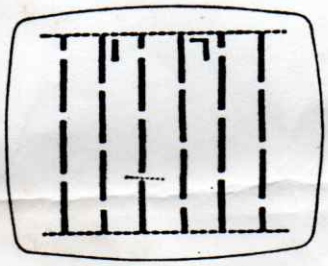


Squash

This game uses a playing area as shown above. Each player can move over the whole court. The game will start when the player whose service it is, depresses his service button. The ball moves off with a random angle toward the front wall. The colour of the ball will change to the colour code of the next player to hit the ball. Should the wrong player intercept or be hit by the ball it will be considered a fault. Points will only be given if won on player's own service. Points won on opponents serve will only cause a service change.

Solo Squash

This game is a single player squash. The right score counts the number of successive hits in the current game (to a maximum of 15), the left score the number of volleys played.

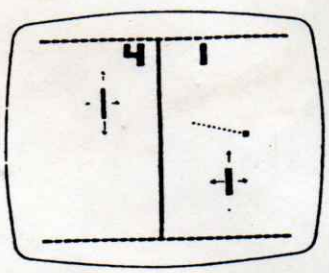


Gridball

This game uses a playing area as shown above. Each player has three sets of vertically moving barriers to block the ball from approaching his end and opening in the barriers to permit the ball to advance toward the opponent's end. The game starts when both players have depressed their service buttons. The ball moves away from the face off point with a random angle in either direction.

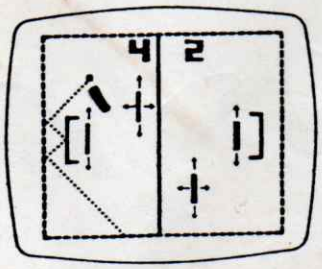
Target

Both target games have a black target square which moves across the screen at random. The players have individually controllable crosshairs. The object of the game is to align the crosshairs on the target, and then to press the trigger (serve) button. The score shows each player's tally of hits.



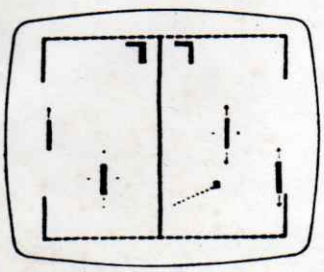
Tennis

This game uses a playing area as shown above. Each player can only move around his side of the court. The game will start when the player whose turn it is to serve, depresses his service button. The service will automatically change every five points scored. At service the ball will move away from the service point with a random angle but always toward the net.



Hockey

This game uses a playing area as shown above. The forwards on both sides have freedom to move over the entire playing area. The goal keepers will be locked in the horizontal axis in front of their respective goals but will move in the vertical axis in the same manner as the forwards.
The game starts when both players have depressed their service buttons. The ball will move away from the face off point with a randomly selected angle in either direction.

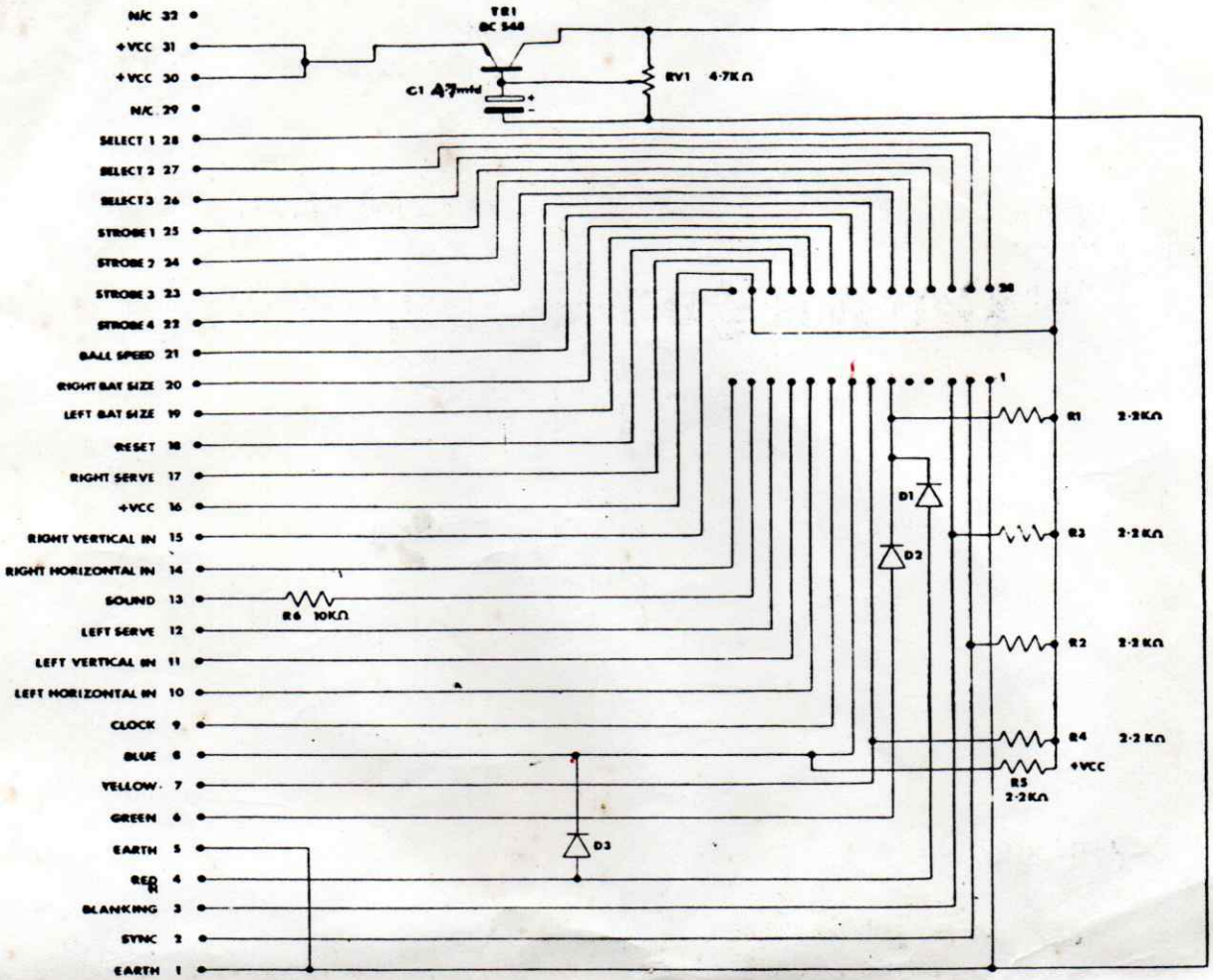


Football

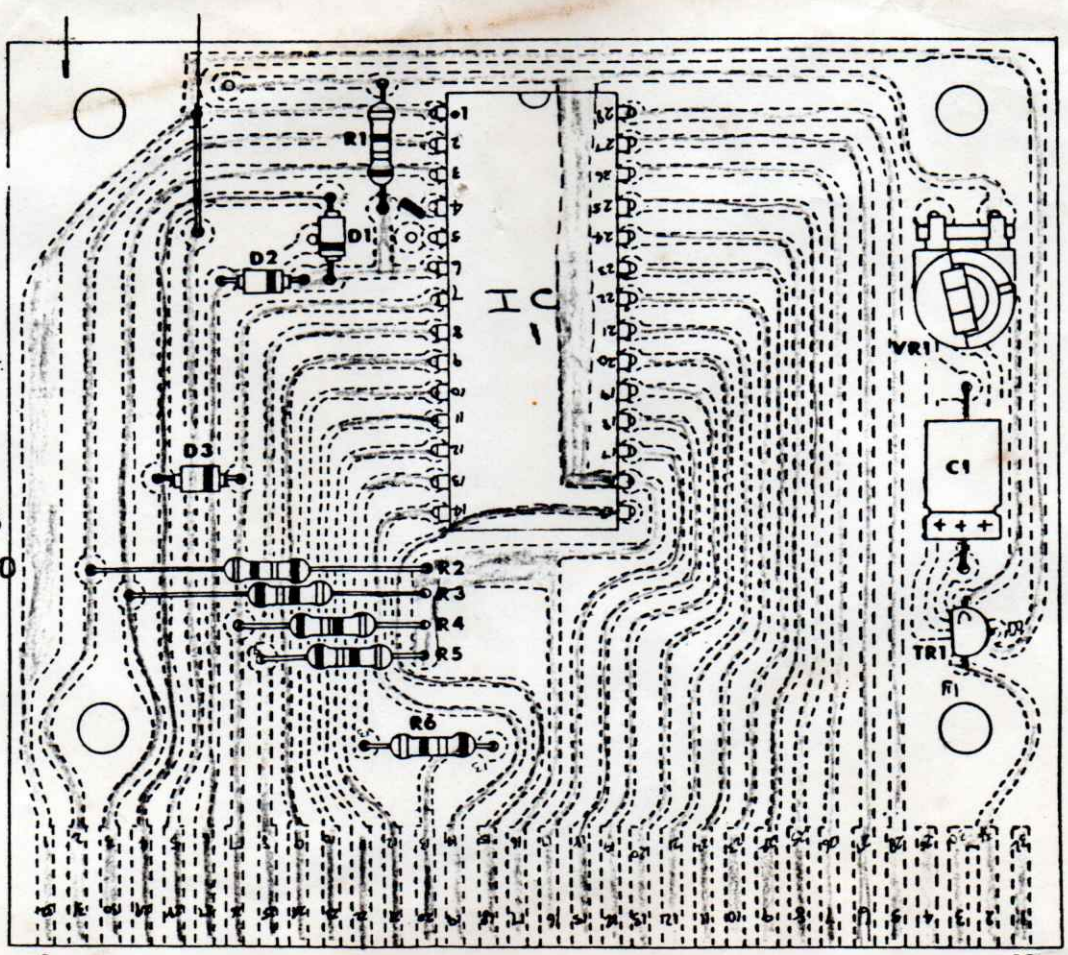
This game uses a playing area as shown above. The motion of the players is as in the hockey game. The game will start when the loser of the previous goal depresses his service button. The ball will move away from the kickoff point with a randomly selected angle but always towards towards the goal of the winner of the previous goal.

Solo Target

This is a one player game. The left counter shows the number of misses, while the right counter shows the number of hits.

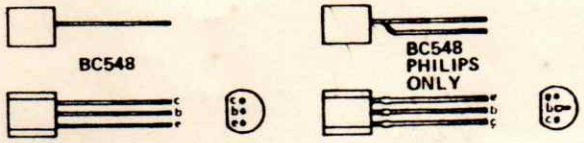


R_1 — 2K2
R_2 — 2K2
R_3 — 2K2
R_4 — 2K2
R_5 — 2K2.
R_6 — 10K
D_1 — D_3 — IN914
V_{R_1} — 4K7
C_1 — 4·7 µF
TR_1 — BC548
IC — AY-3-8610



TRANSISTOR CONFIGURATION CLARIFICATION

Unfortunately various manufacturers make the same BC548 transistors with different package styles. In some instances the package outlines of the transistors differ from the component overlay. IN ALL CIRCUMSTANCES, THE TWO BC548 TRANSISTORS TO BE FITTED TO THE GIMINI UNIT WILL FIT THE HOLES IN THE PCB, WITHOUT BENDING THE TRANSISTOR LEGS ETC. As a result the flat may appear on the opposite side to that shown in the component overlay.



TYPICAL LAYOUT.

PARTS LIST CORRECTION

Resistor
10K BROWN BLACK ORANGE

OMITTED FROM LIST

ZENER IN757A

TEN GAMES CARTRIDGE

OMITTED FROM CONSTRUCTION

ADD ONE SHORTING LINK TO PCB AS PER COMPONENT OVERLAY.

SERVICE ADVICE SLIP:

A repair service is available on this kitset. If you find that you cannot get this kitset to operate correctly after construction, you may forward the complete unit to the following Company:

RADIO SOUND LTD,
65 OLD MILL ROAD, WESTMERE, AUCKLAND, 2.

A service fee of $20 (payable to RADIO SOUND) plus $1.00 postage must be enclosed with the kitset, together with a brief description of your fault AND your return address. The service fee includes replacement of any minor parts (excluding broken cases, PAL Encoder, Modulator, main function ic. Should these components be faulty, you will be advised accordingly. Should you decide not to proceed with the repair at this stage, the kit will be returned to you, however the original service fee is not refundable. The service is offered in a professional manner and only as an alternative to whatever repair facility you may already have. The repair service is NOT an "overhaul facility" but a "first-aid repair". This service is provided NOT as an indication that the kitset is of faulty design, BUT as an extra service for those constructors who may require assistance.